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Conference Abstract

The Future of Referencing Specimens Is Near: Cite the Digital Specimen DOI

Wouter Addink[‡,§], Soulaine Theocharides[§,‡]

‡ Distributed System of Scientific Collections - DiSSCo, Leiden, Netherlands
§ Naturalis Biodiversity Center, Leiden, Netherlands

Corresponding author: Wouter Addink (wouter.addink@naturalis.nl)

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Abstract

Specimens are often mentioned in scholarly publications or data infrastructures by referencing the local identifiers attached to the objects held in specimen collections. However, these are often only unique to the issuing institution and not resolvable. Transforming these into globally unique identifiers, such as the 'Darwin Core Triplet' constructed from codes that specify the institution, the collection and the accession or catalog number, is an imperfect solution. These cannot be unambiguously validated nor be dereferenced (Guralnick et al. 2015, Groom et al. 2019), are vulnerable to human error, and rely on accession numbers that sometimes change over time. Earlier approaches to give specimens globally unique and resolvable identifiers had limited success (Page 2009). Attaching labels with new identifiers is too costly and time consuming, apart from digital infrastructure challenges.

The Digital Extended Specimen is a new object on the internet, containing all known information about the specimen, thus acting as a surrogate for the physical object. To distinguish it from its physical counterpart, it needs a new identifier, which also provides a solution to unambiguously and persistently refer to specimens. Digital specimens get Digital Object Identifiers (DOIs) and Persistent Identifiers, in the infrastructure developed in the BiCIKL project (see deliverable D7.1 and this blog post). Ties to these accession or catalog numbers of physical specimens, allow these local identifiers to change over time, while still persistently resolving to the digital object.

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DOIs guarantee global uniqueness, persistence and reliable resolution through the oversight of the DOI Foundation and its registration agencies (RAs). DiSSCo, Distributed System of Scientific Collections, is creating a partnership with DataCite RA, where both partners invest to provide Digital Specimen DOIs and enhance their findability, leveraging from their metadata services. This aids the potential of Digital Specimen DOIs to reliably create links with data in other infrastructures, cite individual specimens, and improve the FAIR-ness (Findable, Accessible, Interoperable, Reusable) of specimen data worldwide. We will present how to use these new DOIs in practice.

The use of Digital Specimen DOIs in a publication to reference a specimen is already piloted (Deeleman-Reinhold et al. 2024). All specimen records cited in the publication have been assigned a DOI that points to a digital representation of the specimen, the Digital Specimen, which can evolve over time to become a digital extended specimen by digitally linking it to relevant ecological, environmental, and related data such as the publication itself. The DOIs redirect both to a machine readable and a human readable version and include metadata in the DOI record for machine actionability that is also findable in DataCite Commons. The Crosscite citation formatter offers guidance to users how to cite a Digital Specimen DOI, similar to DOIs that refer to other works.

Keywords

identifiers, Digital Extended Specimen, BiCIKL, PID, data infrastructure

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Wouter Addink

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Conflicts of interest

The authors have declared that no competing interests exist.

References

- Deeleman-Reinhold C, Addink W, Miller J (2024) The genera *Chrysilla* and *Phintelloides* revisited with the description of a new species (Araneae, Salticidae) using digital specimen DOIs and nanopublications. Biodiversity Data Journal 12 (e129438). https://doi.org/10.3897/BDJ.12.e129438
- Groom Q, Besombes C, Brown J, Chagnoux S, Georgiev T, Kearney N, Marcer A, Nicolson N, Page R, Phillips S, Rainer H, Riccardi G, Röpert D, Shorthouse D, Stoev P, Haston E (2019) Progress in Authority Management of People Names for Collections. Biodiversity Information Science and Standards 3 https://doi.org/10.3897/biss.3.35074
- Guralnick R, Cellinese N, Deck J, Pyle RL, Kunze J, Penev L, Walls R, Hagedorn G, Agosti D, Wieczorek J, Catapano T, Page RDM (2015) Community Next Steps for Making Globally Unique Identifiers Work for Biocollections Data. ZooKeys 494: 133-154. https://doi.org/10.3897/zookeys.494.9352
- Page RD (2009) bioGUID: resolving, discovering, and minting identifiers for biodiversity informatics. BMC Bioinformatics 10 https://doi.org/10.1186/1471-2105-10-s14-s5